REMARKS

Regarding the claim amendments

Claim 1 as amended includes the following features:

a. A Lewis acid metal is incarcerated in a crosslinked polymer;

b. The crosslinked polymer is obtained by crosslinking a crosslinkable polymer;

c. The crosslinkable polymer has hydrophilic substituents that contain crosslinking groups. These hydrophilic substituents are linked directly to the main chain of the crosslinkable polymer;

d. The crosslinkable polymer has aromatic hydrophobic substituents linked directly to the crosslinkable polymer chain. The aromatic hydrophobic substituents do not contain hydrophilic groups or crosslinking groups;

e. The crosslinkable polymer contains at least one type of monomer unit that contains (a) an aromatic hydrophobic substituent which does not contain hydrophilic groups or crosslinking groups and (b) a hydrophilic substituent containing a crosslinking group.

Features a and b were in the claim as originally filed. In feature c above, the only newly added requirement is that the hydrophilic substituents containing crosslinking groups are linked directly to the main polymer chain. Support for this is found at page 4 lines 18-22 of the specification.

Feature d contains two newly added limitations. The first is that the hydrophobic substituents are linked directly to the main polymer chain. This is also supported at page 4 lines 18-22. The second is that the hydrobphobic substituents do not contain hydrophilic groups or crosslinking groups. This is supported at page 4 lines 25-27 of the specification.

Feature e is newly added to claim 1. It is supported by original claim 2 (monomer unit with hydrophobic and hydrophilic substituents) together with page 4 lines 25-27 of the specification (hydrophobic substituent devoid of hydrophilic or crosslinking groups).

Claim 2 has been amended to remove material that has been introduced into claim 1, and to further specify that the monomer unit that contains a hydrophobic substituent contains no hydrophilic substituent containing a crosslinking group. Support for this is again found at page 4 lines 25-27 of the specification.

Claim 3 has been amended to delete limitations that are already recited in claims 1 and 2, from which claim 3 depends.

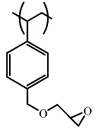
Claims 4, 13 and 14 have a minor amendment to conform their language to that of amended claim 1. No change in scope is intended by the amendments to these claims.

Claims 5, 6 and 7 are all amended to further specify that the crosslinkable polymer contains a monomer unit that contains a hydrophobic substituent but no hydrophilic substituent containing a crosslinking group. Support for this is again found at page 4 lines 25-27 of the specification.

Regarding the Rejection under 35 USC §103(a)

The examiner rejected the previous claim set over two references by the same group of inventors who are the applicants here. The primary reference, Akiyama et al. (JACS, 2003, 125, 3412-3413) describes encapsulating palladium with three copolymers that are designated as 1a, 1b and 1c in the right-hand column of page 3412.

Each of Akiyama's polymer 1a, 1b and 1c contain repeating 4-vinylbenzyl glycidyl ether units, which have this structure:



The 4-vinylbenzyl glycidyl ether units units have a hydrophobic substituent (the aromatic ring), and a hydrophilic group (the glycidyl ether group) that is attached to the hydrophobic substituent. The glycidyl ether group also acts as a crosslinking group in polymers 1a, 1b and 1c. The glycidyl ether group is not linked directly to the main polymer chain.

The claims as now amended specifically exclude polymers of the type described in the Akiyama et al reference. The amended claims require the crosslinkable polymer to have aromatic hydrophobic substituents linked directly to the crosslinkable polymer chain and that those aromatic hydrophobic substituents do not contain hydrophilic groups or crosslinking groups. In addition, the amended claims require that the hydrophilic substitutents that contain crosslinking groups are linked directly to the main polymer chain. The 4-vinylbenzyl glycidyl ether units in the polymers described in the Akiyama et al reference violate both of these restrictions on the subject matter of the amended claims.

The secondary refernence, Kobayashi (US 6352954), describes encapsulating Lewis acid metals, but uses a polymer system which is unlike either that of the present invention or that of Akiyama et al.

Neither Akiyama by itself nor in combination with Kobayashi suggests to modify Akiyama's polymer system to produce the presently claimed invention.

As further evidence of the patentability of the invention now being claimed, applicants submit the declaration of Ryo Akiyama. He is the same Dr. Ryo Akiyama who an inventor in this application and who is an author of the Akiyama et al. reference relied on by the examiner.

Dr. Akiyama compared the performance of three incarcerated scandium systems. One is according to Example 6 of this patent application, and within the scope of amended claim 1. The second system used a polymer very similar to polymer 1c of the Akiyama et al. reference. The third system is very similar to but slightly different than that polymer 1c, but still outside the scope of the amended claims here.

As shown in Dr. Akiyama's declaration, the incarcerated catalyst of this invention performed significantly better than either of the comparative systems, in at least two respects. First, leaching of the incarcerated metal is significantly reduced. Second, when used as a catalyst in a Mukaiyama aldol reaction, significant better yields are obtained. These results are summarized in paragraph 13 of Dr. Akiyama's declaration.

These results are clear evidence of an unexpected result that is achieved with the present invention, and therefore further establish the non-obviousness of the invention as it is now claimed.

Accordingly, the invention as now claimed is both novel and non-obvious over the cited references, individually or in combination. A notice of allowance is respectfully requested.

Respectfully submitted,
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